IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION
OF: TAKAGI ET AL.
SERIAL NO. 10/019,481
FILED: APRIL 04, 2002
FOR: ANT CONTROLLERS AND METHOD FOR APPLICATION THEREOF

DECLARATION

I, Hassan Oloumi-Sadeghi, a Ph.D. entomologist, joined American Cyanamid Company in 1992 at Princeton, NJ, USA. Before joining American Cyanamid, I worked for University of Illinois at Urbana/Champaign, USA from 1985 to 1991. I joined BASF Corporation, Florham Park, NJ 07932, USA in June 2000 following the acquisition of American Cyanamid by BASF. BASF Corporation relocated me in July 2002 to Research Triangle Park, NC 27709, USA, where I continued working in the field of research and development of compounds suitable for the control of pests, and I am therefore fully conversant with the pertinent art.

I have studied application Serial No. 10/019,481 and the record thereof, and I am therefore also fully acquainted with the particular technical field to which the invention belongs.

I have read the Office action which issued in application Serial No. 10/019,481 on November 16, 2005, and I have studied the prior art referenced therein, in particular the teachings of *Takagi et al.* (*US 5,543,573*) and the teachings of *Treacy et al.* (*US 6,342,518*) which were applied by the Examiner in rejecting the methods which are defined in the current claims, ie. Claims 1, 10 and 13 to 17.

It is my understanding that the Examiner considers the methods defined in Claims 1, 10, 13, 14, 16 and 17 to lack novelty in light of, or is anticipated by, the teaching of *Treacy et al.*, and contends that the methods defined in Claims 1, 10 and 13 to 17 were already well within the purview of a person working in the field of pesticidal ingredients in view of the teachings of *Takagi et al.* and of *Treacy et al.* I cannot share the Examiner's position for the following reasons.

Claims 1, 10, 13 and 14 define a method in which a particular pest which is selected from the Isoptera, Hymenoptera, Orthoptera and Psocoptera orders is controlled by applying an effective amount of a certain hydrazine compound of formula (I-1) to the pest or to a wooden

part or to soil in the habitat of the pest, Claim 15 defines a method in which houses and certain articles are protected against a particular pest which is selected from the Rhinotermitidae, Termitidae, Kalotermitidae and Termopsidae families by applying an effective amount of a certain hydrazine compound of formula (I-1) to the pest, to its nest or habitat, to a place at which occurrence of said pest is expected or to the article, and Claims 16 and 17 define a method in which a particular pest from the Formicidae family is controlled in crops by applying an effective amount of a certain hydrazine compound of formula (I-1) to the pest, to the crops, to soil surrounding the crops, or to a nest of the pest.

Apart from the fact that the claimed methods require the application of certain amounts of the hydrazine compound to particular pests and/or locations, the methods also require that the hydrazine compound (I-1) meet particular structural requirements, e.g. the requirement that the moiety Y in formula (I-1) represent 1 to 5 substituents selected, independent from one another, from the group of nitro and cyano substituents.

It is my understanding of the concept of anticipation that a claimed procedure is anticipated where the prior art contains an identical description of the process defined in the claim, and it is my understanding of the concept of obviousness that a claimed procedure is rendered obvious where the prior art conveyed information which suggested the procedure itself, including all of its particular requirements, and also suggested that the particular procedure would likely be successful. Based on that understanding I cannot find any information in the teaching of *Treacy et al.* or in the teaching of *Takagi et al.* which would justify the Examiner's respective rejection.

Treacy et al. teach a method for the synergistic control of insects in which effective amounts of a composition comprising a synergistic combination of

a) a neuronal sodium channel antagonist, and

b) an arylpyrrole insecticide

are applied.[1] According to *Treacy et al.*'s teaching the synergistic combination is highly effective against a wide variety of lepidopteran and coleopteran insects such as *Helicoverpa zea*, *Heliothis virescens*,

[1] E.g. col. 1, indicated lines 50 to 67, of US 6,342,518.

Leptinotarsa decemlineata and *Diabrotica spp.* and the like.[2] Additionally, Treacy et al. state[3]

> *Further, the composition of the invention may be useful in the prevention and control of public health pests such as houseflies, mosquitos, cockroaches, ants, termites or the like.*

Treacy et al. employ as the neuronal sodium channel antagonist inter alia a generic group compounds, represented in the reference by formulae (I) to (III), and formula (I) of the reference encompasses the hydrazine compound of formula (I-1) referenced in the claims of application Serial No. 10/019,481.

On the one hand, where the reference addresses the control of public health pests it clearly refers to the effectivity of the composition rather than the effectivity of one of the ingredients employed in the composition. Also, in my opinion, the wording "*may be useful*" does not express or suggest that usefulness can reasonably be expected in all circumstances. Accordingly, those statements in the reference are, as I understand them, not sufficient to imply that all of the compositions can reasonably be expected to be useful. Those statements are, in my opinion, even less suited to hint that certain amounts of any one particular group of compounds within the realm of the neuronal sodium channel antagonists (a) or the arylpyrrole insecticides (b) of Treacy et al.'s combination could be used successfully to control a pest from the Isoptera, Hymenoptera, Orthoptera and Psocoptera orders, a pest from the Rhinotermitidae, Termitidae, Kalotermitidae and Termopsidae families, or a pest from the Formicidae family.

On the other hand, where the reference addresses the effectivity of certain representatives of the neuronal sodium channel antagonists (a) and/or the arylpyrrole insecticides (b), ie. in the context of the illustrative examples, the effectivity pertains to the control of *Helicoverpa zea* and *Heliothis virescens*. The respective insects are, however, not within the realm of pests from the Isoptera, Hymenoptera, Orthoptera and Psocoptera order, pests from the Rhinotermitidae, Termitidae, Kalotermitidae and Termopsidae families, or pests from the

---

[2] E.g. col. 7, indicated lines 26 to 31, and the examples in col. 8, indicated line 42, to col. 9, indicated line 51, of US 6,342,518.

[3] Cf. col. 7, indicated lines 32 to 35, of US 6,342,518; emphasis added.

Formicidae family, so that the data which are set forth in the context of the examples also fail to suggest that one of the compounds which were investigated in the tests described in the reference could be used successfully to control a pest from the Isoptera, Hymenoptera, Orthoptera and Psocoptera orders, a pest from the Rhinotermitidae, Termitidae, Kalotermitidae and Termopsidae families, or a pest from the Formicidae family.

The teaching of *Takagi et al.* is, in my opinion, equally unsuited to suggested the methods which are defined in the claims of application Serial No. 10/019,481, or to suggested that the particular methods could reasonably be expected to be successful. The reference discloses hydrazinecarboxamide derivatives which are generic to the hydrazine compound of formula (I-1) referenced in the claims of application Serial No. 10/019,481,[4] and the reference states that the hydrazinecarboxamide derivatives have a wide insecticidal spectrum which renders the derivatives suitable for the control of various insect pests such as agricultural insect pests, forest insect pests, horticultural insect pests, stored grain insect pests, sanitary insect pests, nematodes etc.[5] The reference further mentions Hemiptera, Diptera, Tylenchida, and in particular Lepidoptera and Coleoptera pests and the like,[6] and illustrates the effectivity of a variety of representatives against *Spodoptera litura*[7] and against *Sitophilus zeamais*.[8] In my opinion, the teaching of *Takagi et al.* is by far too general to suggest or imply that any particular group of compounds within the realm of the hydrazinecarboxamide derivatives delineated by the reference exhibits a particularly noteworthy effect against any one of the specific pests which are controlled in accordance with the

---

[4] E.g. col. 1, indicated line 41, to col. 3, indicated line 24, of US 5,543,573.

[5] Cf. col. 1, indicated lines 16 to 18, and col. 62, indicated lines 6 to 11, of US 5,543,573.

[6] Cf. col. 62, indicated line 11, to col. 63, indicated line 2, of US 5,543,573.

[7] Cf. col. 65, indicated line 48, to col. 70, indicated line 65, of US 5,543,573.

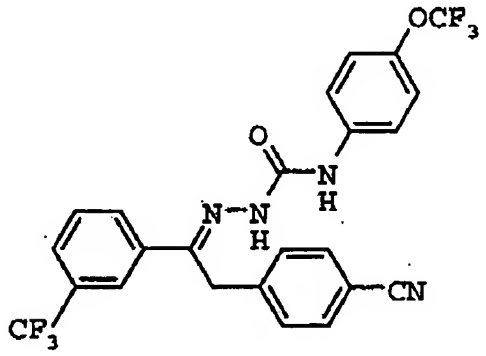
[8] Cf. col. 71, indicated line 1, to col. 75, indicated line 43, of US 5,543,573.

methods defined in the claims of application Serial No. 10/019,481, especially since the pests which are emphasized by *Takagi et al.* differ considerably from the pests referenced in the claims of this application.

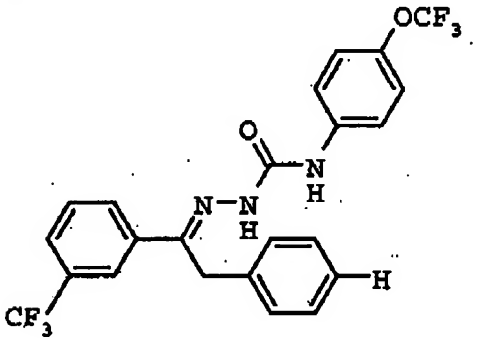
It is well known in the insecticidal art that the classification of a compound as an insecticide does not mean that the compound is equally effective against all insect pests. Correspondingly, where a group of compounds is designated as insecticides, a person of ordinary skill does not reasonably expect that each representative exhibits an equal efficiency in the control of all insect pests. The fact that different compounds even within a group of insecticides can vary considerably in their effectivity against one specific insect pest is, for example, corroborated by the data provided in either one of Tables 7 and 8 of *Takagi et al.* The "judgement" column of these tables show that the effectivity of the investigated compounds varies from 100% mortality to 50 to 79% mortality of one insect pest, depending on the compound which is employed. The respective data further corroborate that a complete control of one insect pest which is achieved by a certain compound does not suggest or imply that the same compound will achieve a similar degree of control when it is applied to another insect pest. Table 8 of *Takagi et al.* shows, for example, that 200 ppm of the compounds designated as A017, A118, A134, A466, B047, B061, and B084 cause 100% of mortality when applied to maize weevil. However, the application of 500 ppm of the same compounds to cutworms only results in 50 to 79% mortality.

In order to illustrate the particular and unexpected advantage which is achieved in accordance with the methods defined in the claims of application Serial No. 10/019,481, I conceived the following experiments and investigations. The tests were carried out under my supervision. The tests were conducted using Example No. 44 as a representative of the compounds (I-1) referenced in the claims of the application, and using compound A007 of *Takagi et al.* for comparison. For completeness sake it is noted that compound A007 of *Takagi et al.* is among the examples which are taught by the reference to exhibit 100% mortality in each of the described investigations. The structures of the investigated compounds are as follows:

Example No. 44 (according to application Serial No. 10/019,481):



Example A907 (according to Takagi et al.):



I) Investigations into the activity against ants (pests of the order *Hymenoptera*)

The activity of the two compounds against Argentine ant, *Linepithema humile*, and western harvester ant, *Pogonomyrmex occidentalis*, workers was evaluated via a forced exposure soil contact bioassay as follows.

The tests were conducted in 100 x 50 mm glass crystallizing dishes. The dishes were pretreated by dispensing a thin layer of 1% agar into the dishes and then spreading 5 g, corresponding to a thin layer, of Florida sandy soil over the agar layer. The active ingredients were applied to the soil in form of acetone solutions which were dispensed with a fine dropper over the soil surface to simulate a spray treatment at a rate of 0.4 l/m². Subsequently, the dishes were vented to evaporate the acetone, and then infested with the ants.

Plastic covers were used to conserve moisture and additional water was added as needed. The dishes were maintained in the laboratory at 22°C and mortality of the ants was monitored daily for a period of 7 to 10 days.

The compounds were applied in amounts of 300 ppm against Argentine ant, *Linepithema humile*, workers. Example No. 44 according to application Serial No. 10/019,481 caused **90% mortality** within 7 days whereas the same application rate of compound A007 of *Takagi et al.* caused over the same amount of time only **4% mortality.**

The compounds were applied in amounts of 3000 ppm against harvester ant, *Pogonomymex occidentalis*, workers. Example No. 44 according to application Serial No. 10/019,481 caused **40% mortality** within 9 days whereas **no mortality** was caused by the same amount of compound A007 of *Takagi et al.* over the same period of time.

II) Investigations into the activity against termites (pests of the order *Isoptera*)

The activity of the two compounds against eastern subterranean termite, *Reticulitermes flavipes*, and southeastern subterranean termite, *Reticulitermes virginicus*, workers was evaluated via forced exposure soil contact bioassays. The behavior of the treated termites was studied through tunneling assays.

The forced exposure assays were conducted in plastic 60 x 15 mm Petri dishes which had been pretreated with a thin layer of 1% agar and 2 g of treated sandy-loam soil spread over the agar layer. The soil had been treated with acetone solutions of the active ingredients to a content of 30 ppm (w/w) of the active ingredient in dry soil. The termite workers were confined on the soil surface with a small piece of filter paper (1 cm^2) as a food source. The dishes were maintained at 25°C and 85% humidity. Mortality was assessed daily for a period of 7 days.

Example No. 44 according to application Serial No. 10/019,481 caused under these conditions over **85% mortality** of the *Reticulitermes flavipes* workers and **90% mortality** of the *Reticulitermes virginicus* workers.

Compound A007 of *Takagi et al.* caused under the same conditions only **25% mortality** of the *Reticulitermes flavipes* workers, and only **50% mortality** of the *Reticulitermes virginicus* workers.

The soil tunneling assays were conducted in transparent PVC tubes having a length of 13 cm and a diameter of 1.5 cm. The middle of each tube was packed with sandy-loam soil to form a 5 cm soil column. The soil had been treated with acetone solutions of the active ingredients to a content of 30 ppm (w/w) of the active ingredient in dry soil. The soil column was held in place by 1 cm plugs of 5% agar. One end of the tube was packed with a preferred food source (wood flour), and *Reticulitermes flavipes* workers were introduced into the opposite end of the tube with small strips of filter paper provided as a food source. The ends of the tubes were plugged with stoppers and the tubes were set upright with the termites in the top part of the tubes and the wood flour at the bottom. Termite penetration was measured daily and termite mortality was recorded after 7 days.

Example No. 44 according to application Serial No. 10/019,481 caused under these conditions 100% mortality of the *Reticulitermes flavipes* workers.

Compound A007 of *Takagi et al.* caused under the same conditions only 25% mortality of the *Reticulitermes flavipes* workers.

Additionally, the activity of the two compounds against eastern subterranean termite, *Reticulitermes flavipes*, and Formosan subterranean termites, *Coptotermes formosanus*, was evaluated in bait assays.

To this end 0.1% of the active ingredients (w/w) were incorporated into cellulose bait (aspen fiber). The tests were conducted in 100 x 15 mm Petri dishes with 10 g sand spread in a thin layer over the bottom of each dish and an additional 2.5 g sand piled against the side. Water (2.8 ml) was applied to the piled sand. Additional water was added as needed over the course of the bioassay to maintain moisture content in the sand. Bait samples (0.25 g) were packed into 50 x 9 mm Petri dishes with tight fit lids having a 3 mm hole in the side of the dish for termite entry, and were moistened with 0.5 ml water. Testing was conducted with one bait enclosure per dish. The test dishes were maintained at 25°C and 85% humidity. Assessment was conducted daily for a period of 14 days for mortality [dead or moribund termites (morbidity characterized by inability to stand with weak movement of legs)] and for intoxication (characterized by uncoordinated movement).

Example No. 44 according to application Serial No. 10/019,481 caused under these conditions 100% mortality of *Reticulitermes flavipes*

and 95% mortality of *Coptotermes formosanus*.

Compound A007 of Takagi et al. caused under the same conditions only 27% mortality of *Reticulitermes flavipes*, and only 9% mortality of *Coptotermed formosanus*.

The foregoing results further corroborate that the compounds which are employed in accordance with the methods disclosed and claimed in application Serial No. 10/019,481 are by far more effective and significantly better suited to achieve a control of the ants and termites. Moreover, I find nothing in the teachings of Takagi et al. and/or Treagy et al. which were applied by the Examiner in the Office action dated November 16, 2005, which suggests or implies the distinct and unexpected advantages which are achieved by the method.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information or belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 101 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed at Research Triangle Park, this 8 day of March 2006.

Hassan Oloumi-Sadeghi

(Signature of Declarant)